U.G. 3rd Semester Examination-2020

COMPUTER SCIENCE

[PROGRAMME]

Course Code : COM.SC-G-CC-L-301C

[SUPPLEMENTARY]

(Analysis of Algorithms and Data Structures)

Full Marks : 40 Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP-A

1. Answer any **five** questions from the following: 2×5=10

   a) What are the various operations that can be performed on different data structures?

   b) How a linked list can be used to implement stack?

   c) What is an abstract data type?

   d) What is binary search tree?

   e) Define big-O notation.

   f) What is algorithm?

   g) What do you mean by external sorting?

   h) What is an array?

GROUP-B

2. Answer any **two** questions: 5×2=10

   a) What do you mean by time complexity and space complexity? What is recursion? What is priority queue? 2+1+2=5

   b) Construct a binary search tree with the following inorder and postorder traversal: 5

      postorder : B, C, A, P, N, T, L, K, G, F, P

      inorder : A, B, C, D, F, G, K, L, N, P, T

   c) Write an algorithm to delete a node from a linear linked list. 5

   d) Write down the algorithm of bubble sort. 5

GROUP-C

Answer any **two** questions: 10×2=20

3. a) Write down the algorithm to implement PUSH ( ) and POP ( ) operations in stack.

   b) Write an algorithm for binary search. 5+5=10

4. a) What are the differences between stack and queue?

   b) Write the algorithm for merge sort.

c) Write down the best case time complexity of insertion sort and merge sort. 3+5+2=10

5. a) Sort the following list in ascending order using quick sort :

35, 75, 45, 90, 30, 40, 12, 15, 8, 10

b) What is linked list? What are its advantages over array? What is binary search tree?

5+2+2+1=10

6. Write short note on any **two** of the following: 5×2=10

a) B-Tree

b) Sparse matrix

c) Priority queue

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